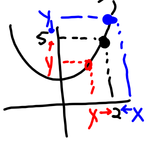
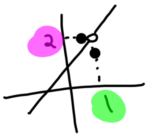
Review I Limits

explain $\lim_{x\to 2} x^2+1 = 5$ to someone not in calc

as x approaches 2 from both sides, $y = x^2+1$ approaches 5



$$\lim_{x\to 1}\frac{x^2-1}{x-1} = \lim_{x\to 1}\frac{(x+1)(x-1)}{(x-1)} = \lim_{x\to 1} x+1 = 2$$



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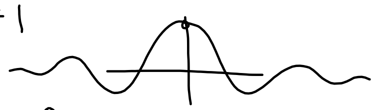
$$\lim_{x\to 0}\frac{\sin x}{x} = 1$$



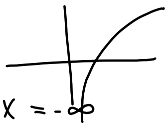
$$\lim_{x\to\infty}\frac{\sin x}{x} = 0$$

$$\lim_{x\to\infty}\left(1+\frac{1}{x}\right)^x = e$$

$$\lim_{x\to\infty}\left(\frac{x+1}{x}\right)^x = e$$

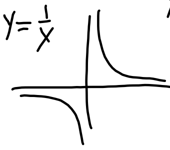
$$\lim_{x\to\infty}\left(\frac{x}{x+1}\right)^x = \frac{1}{e}$$

$y=\ln x$

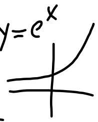


$\lim_{x\to 0^+}\ln x = -\infty$

$y=\frac{1}{x}$



$y=e^x$



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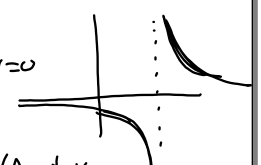
$\lim_{x\to 2^\pm}\frac{1}{x-2} = \pm\infty$ VA at $x=2$

$\lim_{x\to \pm\infty}\frac{1}{x-2} = 0$ HA at $y=0$



If $\lim_{x\to c} f(x) = \pm\infty$ then VA at $x=c$

If $\lim_{x\to \infty} f(x) = L$ then HA at $y=L$

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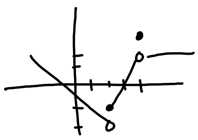
$\lim_{x\to 2} f(x) =$ dne because lhl ≠ rhl

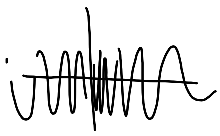


$\lim_{x\to 2^-} f(x) = -2$

$\lim_{x\to 2^+} f(x) = -1$

$\lim_{x\to 4} f(x) = 2$

$\lim_{x\to 0}\sin\left(\frac{1}{x}\right) =$ dne



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